Health science

Study guide grade 12 unit 9 Pharmacy

WHAT IS PHARMACY?

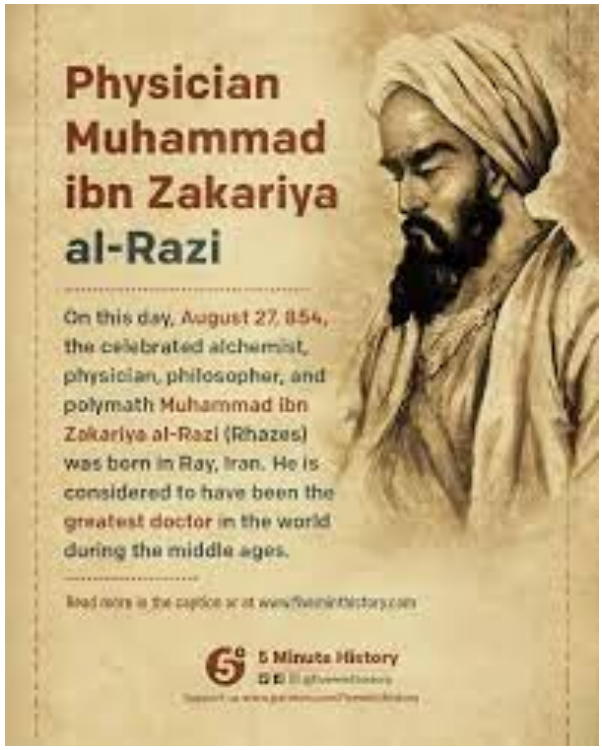
The science of collecting, preparing and dispensing drugs.
It's the clinical health science that combines medical science, chemistry and biology.
Pharmacy is the study of drug action and the effects those drugs have on our body.

HISTORY

Pharmacy started existing a long time ago as part of medicine. It started in Ancient Greece, Rome, Middle East, Egypt, India and China. It is said that Asclepius and Hygeia used a plant to treat a wound, this is the first record of a person being treated with a drug. They were considered the masters of medicine, health and hygiene.

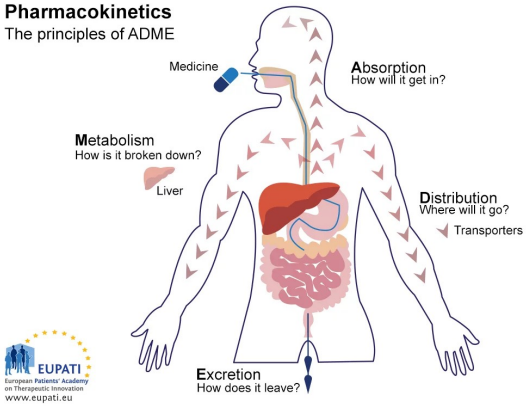
In ancient Egypt, India and China, physicians started treating sick people using natural plants and herbs. In ancient Egypt a small separation between pharmacy and medicine happened. It was decided that some physicians would visit sick people and other physicians would prepare treatments and wait for sick people to visit them.

During the Islamic Golden Age (8th century to the 14th century), the separation between pharmacy and medicine happened. Muslim scientists and physicians had a lot of knowledge in chemistry and botany. This helped them discover different ways of preparing medicines, they also wrote a lot of books. Al Razi was a Muslim doctor, scientist and philosopher. During the Islamic Golden Age, he was the first to write books based on home treatments.



In the 16th century a law was created that didn't allow doctors to prepare medicines for their patients. Pharmacists were the only professionals allowed to prepare medicines.

Pharmacology is divided into two different areas of study; those areas are called pharmacokinetics and pharmacodynamics.



Pharmacokinetics is the study of what the body does to the drug. It has four stages:

- How the medicine gets into the body: **absorption**
- Where the medicine goes in the body: **distribution**
- What the body does to the medicine: **metabolism**
- How the body gets rid of the medicine: **excretion**

Pharmacodynamics is the study of what the drug does to the body. Points to consider are:

- What does the drug do to the body?
- What receptors are activated?
- What other effects does the drug have?

Factors that influence pharmacodynamics are:

- Patient age
- Disease type
- Pregnancy
- Other drugs in the body

Drugs are chemical substances that are taken from plants, animals, microorganisms or minerals. Drugs are considered ingredients. They are not used directly as a treatment.

Medicines are used directly as a treatment, for example: medicines can treat a pain or cure an infection. Medicines are a result of a drug or drugs being mixed, sometimes with an excipient sometimes without.

Excipients are used when making medicines, they help to formulate, protect or support a medicine. Excipients make medicines safer for us to use. Most medicines have excipients added to them.

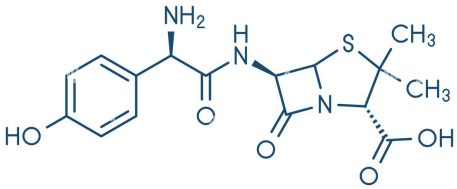
Drug Nomenclature

Chemical name

- Based on the chemical composition and structure

Generic name (Official, Approved)

- This is usually the abbreviated form of the chemical name
- This name is used and chosen by official bodies



amoxicillin

alamy
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Proprietary name (Brand name, Company name)

- the name given by the company which markets the drug
- It is the commercial property of a pharmaceutical company
- It indicates a particularly formulation of a particular substance by a particularly manufacturer

Drug groups		
Painkillers	Used to manage pain	Paracetamol
NSAIDs	Relieve or reduce aches caused by inflammation	Ibuprofen
Antihistamines	Used to treat allergies and reactions to bites and stings	Comes in lots of different forms, including tablets, capsules, liquids, creams, eye drops and nasal sprays

Route of administration	Advantages	Disadvantages
Sublingual	avoid first pass effect, rapid absorption, drug stability, can be administered for local effect	small dose limit, inconvenience for some patients
Oral	convenient (portable, easy, painless), economical to the patients (non-sterile, compact), variety (tablets, capsules, liquid, fast, slow release), high dose possible, high surface of absorption, good permeability of GI barrier	may be inefficient (high dose, low solubility), first pass effect (the concentration of a drug is greatly reduced before reaching the systemic circulation), food interaction, local effect (GI flora), not suitable for unconscious patients
Inhalation	bypasses liver, large surface of absorption	difficulties in regulating the exact amount of dosage, difficulties administering the drug via inhaler
Rectal	bypasses liver, useful for children or older people, drug released at slow, steady state	unpredictable absorption, not well accepted by patients
Intravenous	direct access to blood central compartment, bypasses the digestive system, does not harm the lungs or mucous membranes, rapid onset of action	increased risk of infection and overdose, risk of the peripheral vein or arterial damage, limited to highly soluble drugs, fear, trained personnel is needed, sustained/controlled action not possible
Intramuscular	depot or sustained effect is possible	unpredictable or incomplete absorption, trained personnel is needed
Subcutaneous	can be self-administered, slow, but generally complete absorption	painful, tissue damage from irritant drugs, max. 2 ml injection

Route for administration
-Time until effect-

- intravenous 30-60 seconds
- intraosseous 30-60 seconds
- endotracheal 2-3 minutes
- inhalation 2-3 minutes
- sublingual 3-5 minutes
- intramuscular 10-20 minutes
- subcutaneous 15-30 minutes
- rectal 5-30 minutes
- ingestion 30-90 minutes
- transdermal (topical) variable (mins to hrs)

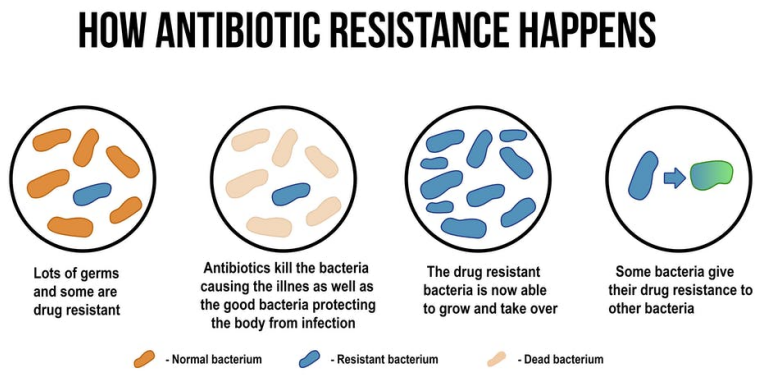
Antibiotics are medicines that destroy or slow the growth of bacteria. Normally when bacteria multiply in the body, the immune system can kill them and fight the infection. However, sometimes the body's immune system cannot fight all the bacterial cells by itself. This is when antibiotics are used. When used properly, they can cure infection and save lives.

People usually take antibiotics orally. They can also be administered via an injection or directly applied to the part of the body that is infected. Most will begin to work within a few hours. It is important to complete the whole course of medication even after symptoms of the infection have improved.

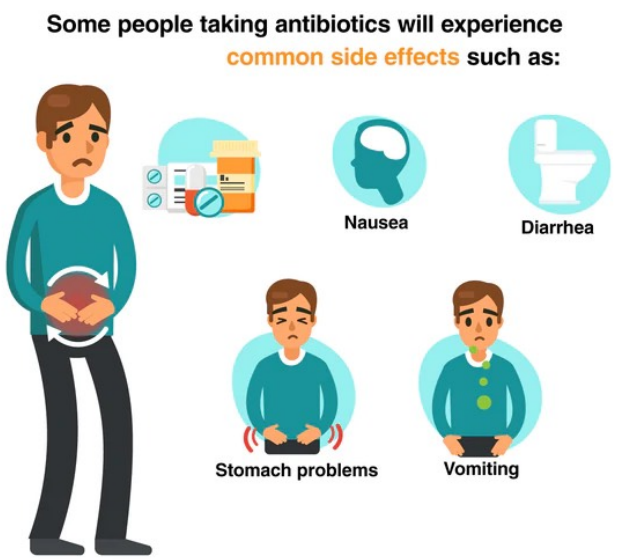
Some medical professionals believe that people are overusing antibiotics. This overuse explains the growing number of bacteria that are becoming resistant to antibiotics.

Antibiotics should only be prescribed to treat conditions:

- That are not very serious but are unlikely to clear up without antibiotics
- That are not serious but could spread if not treated
- Where antibiotics can speed up recovery time
- When the risk of not using them can lead to more dangerous complication's



Side effects of antibiotics
Side effects don't always happen, it depends on the drug and if has been taken following the advice of a doctor or pharmacist.
Side effects can range from mild to life-threatening conditions, although these are very rare.



Measurements	
Abbreviation	**Meaning**
Kg	Kilogram
g	gram
mg	Milligram
mcg	Microgram
ml	millilitre
tsp	Teaspoon (5ml)

Prescriptions	
Abbreviation	Meaning
Rx	Prescription
ac	Before meals
pc	After meals
prn	As needed
bid	Twice a day
tid	Three times a day
aid	Four times a day

Routes of administration	
Abbreviation	Meaning
IM	Intramuscular
IV	Intravenous
PO	By mouth
SC	Subcutaneous
SL	Sublingual
TOP	Topical

Drug formulas in pharmacy

Tablet dosage

Prescribed dose ÷ stock strength = number of tablets needed

Mixtures and solution

Desired dose ÷ stock strength x stock volume = amount of solution

Calculate IV rate

Total IV volume ÷ time (hours or minutes) = ml administered per hour or minute

Safety measures
The six rights of drug administration

How to safely store drugs

1. Store all medication out of reach and out of sight of children
2. Think about products you may not think of as medicines
3. Make sure you close medicine caps tightly after each use
4. Put medicine away after every use
5. Make sure to check the dates on medicines
6. Be careful in places you visit with a child